

IN THE CLAIMS:

Please cancel claims 18, 26 and 28.

Please amend the claims as follows:

1.(currently amended) A method for analyzing the performance of a system, comprising the steps of:

directing collimated light from at least one vertical cavity surface-emitting laser (VCSEL) towards identically encoded portions representing unconnected lines of a bar code formed on planar surfaces formed on and located near ~~inner perimeter on outer perimeters and~~ on inner surfaces of two transparent disks that are independently rotatable on two shafts including ends commonly separated by and coupled to a torsion bar, said two transparent disks each representing input and output mechanisms of the system;

transmitting a portion of the light passing through the transparent disks and not blocked by the encoded portion towards at least one of a sensor plate or detector-~~after said portion of the light passes through the transparent disks and said encoded portions~~; and

detecting ~~a transmitted~~ the portion of the light passing through the transparent disks and not blocked by the encoded portion using the at least one of the sensor plate or detector.

2.(cancelled)

3.(previously amended) The method of claim 1 wherein said encoded portions comprise a bar code.

4.(previously amended) The method of claim 1 wherein said encoded portions comprises at least one measuring feature formed on a planar surface of said disks.

5.(cancelled).

6.(cancelled).

7.(previously amended) The method of claim 1 further comprising the step of:

shaping said encoded portion of said disks to increase transmission of said transmitted light in a particular direction.

8.(previously amended) The method of claim 1 further comprising the step of:

transmitting at least one light beam from said encoded portions of said disks to interact with at least one other light beam to form Moirè fringes on a sensor.

9.(original) The method of claim 1 further comprising the step of:

assessing said system utilizing said performance characteristic data.

10.(original) The method of claim 9 further comprising the step of:

generating an electrical feedback signal from information recovered from said transmitted portion of the light; and

providing said electrical feedback signal to an input of said system, thereby improving said performance characteristic data of said system.

11.(cancelled)

12.(previously amended) The apparatus of claim 33 further comprising:

recovery mechanism that recovers information about a performance characteristic of said mechanical system from the ~~at least one detector or sensor plate~~ detection module.

13.(cancelled).

14.(previously amended) The apparatus of claim 33 wherein the directing element comprises an optical lens.

15.(cancelled)

16.(previously amended) The apparatus of claim 33 wherein said bare-code-like encoded portion comprises a bar code.

17.(cancelled)

18.(cancelled)

19.(currently amended) The apparatus of claim ~~18~~34 further comprising:

a collimating lens located proximate said VCSEL, wherein said collimating lens renders the light beam from said VCSEL into a highly collimated parallel light beam, thereby directing said highly collimated parallel light beam to intercept said encoded portion on said first rotating member.

20.(cancelled)

21.(previously amended) The apparatus of claim 34 wherein the light beam transmitted from said VCSEL is rendered highly collimated by a convex collimating lens before said at least one light beam intercepts at least one encoded portion.

22.(previously amended) The apparatus of claim 21 wherein said ~~at least one encoded portion comprises~~ first and second encoded portions comprise:

a transparent polymer film having parallel lines resembling an opaque bar code imprinted on an upper surface of said transparent polymer film; and

wherein said opaque parallel lines are spaced evenly with a width of a gap formed there between, wherein the width of the gap corresponds to the width of said opaque parallel lines; and

wherein said transparent polymer film is fixed to ~~a rotating member~~ said first and second transparent disks.

23.(previously amended) The apparatus of claim 22 wherein:

said transparent polymer film comprises a bar code when adhered to a ~~rotating disk~~ said first and second transparent disks.

24.(previously amended) The apparatus of claim 23 wherein:

said light beam intercepts said first and second encoded portions at an angle of incidence of about 90°; and

wherein said light beam carries an image of said bar code after being transmitted over said encoded portions.

25.(previously amended) The apparatus of claim 22 wherein an image from said first encoded surface interacts with an image of said second encoded surface after said light beam is transmitted through said second encoded surface to produce Moirè fringes.

26.(cancelled).

27.(previously amended) The apparatus in claim 26 wherein said sensor is located at a Talbot distance from a point where said light beam exits a bottom of said encoded surface of said second rotating member.

28.(cancelled).

29.(currently amended) The apparatus in claim 34 wherein said encoded portion of the first rotating ~~member~~ disk is shaped to increase said transmitted light in a particular direction.

30.(currently amended) The apparatus of claim 34 wherein said encoded portion of the first rotating ~~member~~ disk is shaped to form an optical encoder for encoding information representing performance characteristics of said system.

31.(currently amended) The apparatus of claim 34 wherein said encoded portion of the first transparent disk is provided as a vernier on said first disk to increase accuracy for sensing motion of rotating members in the mechanical system.

32.(currently amended) The apparatus of claim 34 wherein said encoded portion of the first transparent disk comprises features recessed into a surface or edge of said disk.

33.(currently amended) An apparatus for analyzing the performance of a mechanical system including independently rotatable input and output shafts with ends being separated by and coupled to a torsion bar, said apparatus comprising:

two transparent disks independently attached near the ends of the input and output shafts wherein the ends are being separated by and coupled to a torsion bar, wherein each of said transparent disks include inward facing surfaces, said inward facing ~~surface~~ surfaces forming a gap between the two transparent disks based on ~~their~~ the disks' placement on the ends of the input and output shafts which are separated by and coupled to a torsion bar;

bar-code-like encoded portions formed on the inward facing surfaces of the two transparent disks;

at least one directing element that directs light from a vertical cavity surface-emitting laser (VCSEL) through the two transparent disks in order to intercept the bar-code-like encoded portions, wherein a portion of light is transmitted through the bar-code-like encoded portions of the two transparent disks to at least one detector or sensor plate; and

~~at least one detector or sensor plate~~ detector module to receive the transmitted portion of light.

34.(Currently amended) An apparatus for detecting the relative motion between at least two rotating members in a mechanical system, comprising:

a vertical cavity surface-emitting laser (VCSEL) for generating a light beam;

a first encoded portion representing unconnected lines of a bar code located on a an inner surface of a first transparent disk, said first encoded portion facing a second

encoded portion also representing unconnected lines of a bar code located on an an inner surface of a second transparent disk facing the second encoded portion, said first and second encoded portions used for the transmission of images created using the light beam as it passes through the transparent disks towards at least one of a sensor plate or detector ~~that are created using the light beam~~; and

~~at least one detection mechanism comprised of at least one sensor plate or photodetector for receiving the light beam~~, wherein said ~~detection mechanism~~ first and second transparent disks each have an outer surface; and

at least one detector module is located proximate to said mechanical system near at least one outer surface associated with the second transparent disk and ~~opposite the VCSEL~~ is located proximate to said mechanical system near the outer surface associated with the first transparent disk, and wherein the light beam transmitted by the VCSEL travels through the transparent disks and encoded portions to the ~~detection mechanism~~ detector module;

wherein the light beam can be used to detect Moirè fringes formed as a result of the interaction of the images from said first and second encoded portions.